

## CLAIMS

What is claimed is:

1. A thin-film structure processing device for processing a thin-film structure formed on a substrate comprising:

5       a liquefied high-pressure inert gas storage section storing the liquefied high-pressure inert gas,

          a nozzle section for discharging liquefied inert gas stored by said liquefied high-pressure inert gas storage section into atmosphere pressure, and jetting jet flow including dry ice particles of inert gas to said thin-film structure, and wherein said nozzle section having the nozzle structure capable of forming the jet flow strong enough for grinding the thin-film composing said thin-film structure by jetting the jet flow of said inert gas to the thin-film structure.

2. The thin-film structure processing device as defined in claim 1  
15 wherein said nozzle section comprises:

          a first gas pathway used for passage of said inert gas, and

          a second gas pathway adjacent to at least one portion of said first gas pathway, and wherein a dew-condensation prevention gas for preventing dew-condensation of said first gas pathway and the discharging end of the first gas pathway flows through said second gas pathway.

3. The thin-film structure processing device as defined in claim 2 wherein said dew-condensation prevention gas is the nitrogen gas.

4. The thin-film structure processing device as defined in claim 1 wherein said nozzle section comprises:

25       a first gas pathway for said inert gas, and

          a third gas pathway adjacent to the discharging end of said first gas pathway comprising the discharging end, and wherein liquefied nitrogen, and/or liquefied argon flow through said third gas pathway, and in order to

remove static electricity of said inert gas discharged as the jet flow from the discharging end of said first gas pathway, the discharging end of said third gas pathway jets said liquefied nitrogen, and/or liquefied argon in the form of mist.

5           5. A thin-film structure processing device for processing a thin-film structure formed on a substrate comprising:

          a liquefied high-pressure inert gas storage section storing the liquefied high-pressure inert gas,

          an abrasive storage section storing abrasive,

10           a nozzle section for jetting jet flow including dry ice particles of inert gas generated by discharging liquefied inert gas stored by said liquefied high-pressure inert gas storage section into atmosphere pressure, and the abrasive stored by said abrasive storage section, to said thin-film structure, and wherein said nozzle section capable of forming the jet flow  
15           strong enough for grinding the thin-film composing said thin-film structure by jetting the jet flow of said inert gas and said abrasive to the thin-film structure.

          6. The thin-film structure processing device as defined in claim 5 wherein the particles diameter of said abrasive is from 0.01 micron to 1  
20           micron.

          7. The thin-film structure processing device as defined in either claim 5 or 6 wherein said abrasive includes diamond particles.

          8. A method of processing the thin-film structure formed on a substrate wherein the liquefied high-pressure inert gas is discharged into atmosphere  
25           pressure and the jet flow including the dry ice particles of inert gas is jetted to said thin-film structure, thereby processing the thin-film structure.

          9. A method of processing the thin-film structure formed on a substrate,

wherein the jet flow, produced concurrent with discharging dry ice particles of inert gas generated by discharging liquefied inert gas into atmosphere pressure, and the abrasive are jetted to the thin-film structure, thereby processing the thin-film structure.

5           10. A thin-film structure processing device for processing a thin-film structure formed on a substrate comprising:

          a liquefied high-pressure inert gas storage section storing the liquefied high-pressure inert gas,

          a nozzle section for discharging liquefied inert gas stored by said  
10   liquefied high-pressure inert gas storage section into atmosphere pressure, and jetting jet flow including dry ice particles of inert gas to said thin-film structure, and

          a thin-film structure holding section for holding said thin-film structure, and wherein said thin-film structure holding section holds an  
15   object plane of processing of said thin-film structure in an obliquely downward direction, and said nozzle section having the nozzle structure capable of forming the jet flow strong enough for grinding the thin-film composing said thin-film structure by jetting the jet flow of said inert gas to said object plane of processing thereof held in an obliquely downward  
20   direction by said thin-film structure holding section at a non-perpendicular angle.

          11. A thin-film structure processing device for processing a thin-film structure formed on a substrate comprising:

          a liquefied high-pressure inert gas storage section storing the  
25   liquefied high-pressure inert gas,

          a nozzle section for discharging liquefied inert gas stored by said liquefied high-pressure inert gas storage section into atmosphere pressure, and jetting jet flow including dry ice particles of inert gas to said

thin-film structure, and

a thin-film structure holding section for holding said thin-film structure, and wherein said thin-film structure holding section holds an object plane of processing of said thin-film structure in a straight-down direction, and said nozzle section having the nozzle structure capable of forming the jet flow strong enough for grinding the thin-film composing said thin-film structure by jetting the jet flow of said inert gas to said object plane of processing thereof held in a straight-down direction by said thin-film structure holding section at a non-perpendicular angle.

10        12. A thin-film structure processing device for processing a thin-film structure formed on a substrate comprising:

a liquefied high-pressure inert gas storage section storing the liquefied high-pressure inert gas,

a nozzle section for discharging liquefied inert gas stored by said liquefied high-pressure inert gas storage section into atmosphere pressure, and jetting jet flow including dry ice particles of inert gas to said thin-film structure, and

a thin-film structure holding section for holding said thin-film structure, and wherein said thin-film structure holding section holds an object plane of processing of said thin-film structure in an obliquely downward direction, and said nozzle section having the nozzle structure capable of forming the jet flow strong enough for grinding the thin-film composing said thin-film structure by jetting the jet flow of said inert gas to said object plane of processing thereof held in an obliquely downward direction by said thin-film structure holding section.

13. A thin-film structure processing device for processing a thin-film structure formed on a substrate comprising:

a liquefied high-pressure inert gas storage section storing the

liquefied high-pressure inert gas,

a nozzle section for discharging liquefied inert gas stored by said  
liquefied high-pressure inert gas storage section into atmosphere pressure,  
and jetting jet flow including dry ice particles of inert gas to said  
5 thin-film structure, and

a thin-film structure holding section for holding said thin-film  
structure, and wherein said thin-film structure holding section holds an  
object plane of processing of said thin-film structure in a straight-down  
direction, and said nozzle section having the nozzle structure capable of  
10 forming the jet flow strong enough for grinding the thin-film composing said  
thin-film structure by jetting the jet flow of said inert gas to said object  
plane of processing thereof held in a straight-down direction by said  
thin-film structure holding section.

15

20

25